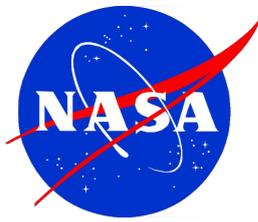


JWST Update

3

Astrophysics Advisory Committee
20-July-2022

Eric P. Smith
JWST Program Scientist
Astrophysics Division Chief Scientist

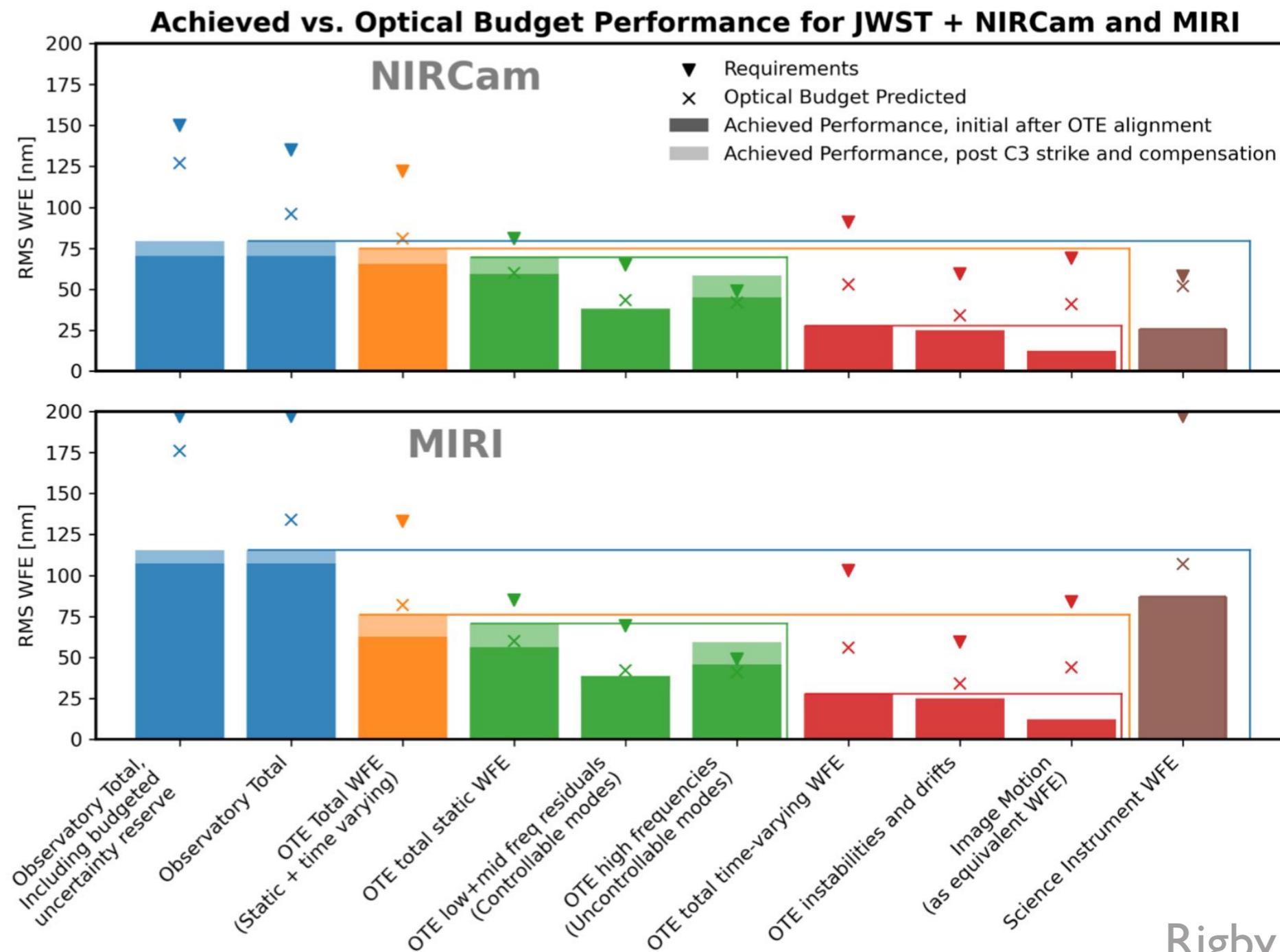


Performance

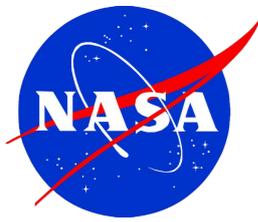
- All 17 instrument modes ready for science
- All mission level 1 requirements met or exceeded
- Diffraction limit near 1.1 microns vs 2 microns requirement
- Near IR backgrounds smaller than expected, mission will go deeper, faster
- Propellant lifetime greater than 20 years



Sharp Vision



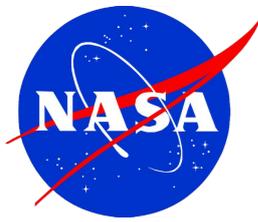
Rigby et al, 2022



NIRCam Sensitivity

Wavelength (microns)	2	3.5
Requirement (nJy)	11.4	13.8
Exposure Time Calculator (nJy)	10	14.1
Measured (nJy)	7.3	8.8

NIRCam limiting point source sensitivity. faintest flux density that can be detected at SNR=10 in 10,000s



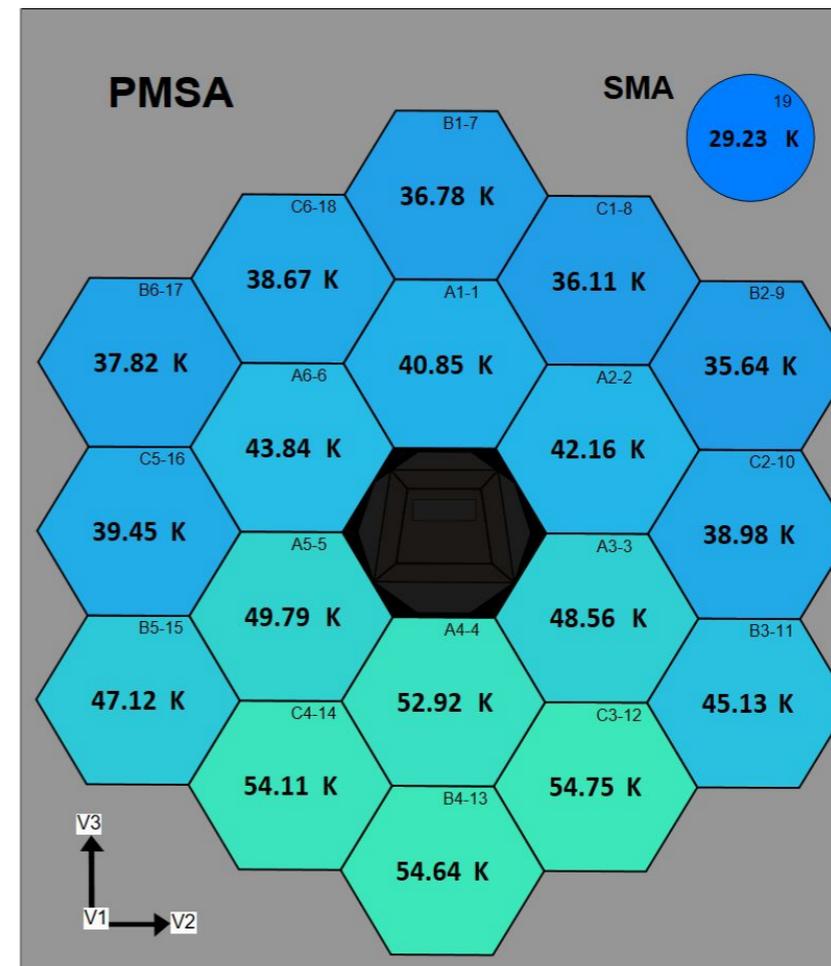
Pointing Control

- Absolute accuracy: observed pointing offsets are generally below 0.19" (1-sigma, radial), and after systematic offsets are removed, the scatter is usually below 0.1". This is compared to the 1" requirement.
- Guide star availability: guiding has been demonstrated using guide stars with brightnesses $12.5 < J < 18$ magnitudes, there is a greater than 95% probability of acquiring a guide star and maintaining pointing stability on any fixed target for any attitude within the field of regard
- Moving targets: demonstrated up to 67 mas/s, compared to our requirement of 30 mas/s.

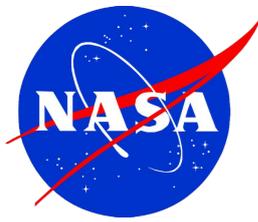


Cryogenic Performance

- The observatory telescope has successfully reached all its operational temperatures.
- All Science Instrument (SI) instruments are within operational temperature ranges and tuned to SI Team requested Targets within those ranges.

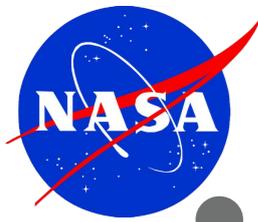


Instrument	Flight (K)	Target (K)
NIRSpec OA	35.57	35.5
NIRSpec FPA	42.80	42.8
FGS	38.48	38.5
NIRCam	38.52	38.5
MIRI	6.03	6.0
Cooler Load	Measured 119 mW	Predicted 118 mW



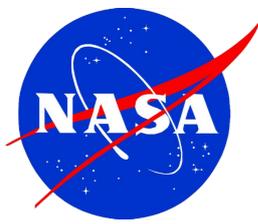
Science Performance Release Notes

- Informs the science community of actual performance at the end of commissioning, and how it differs from expectations.
- Shared alongside the ERO release on July 12, 2022 (Rigby, Perrin, & McElwain +612 co-authors; [arxiv:2207.05632](https://arxiv.org/abs/2207.05632)).
- 6-month commissioning summary in 60 pages, covering information from spacecraft to science operations status.
- **The content will be submitted to the PASP special issue on JWST such that it can be peer-reviewed and cited.**



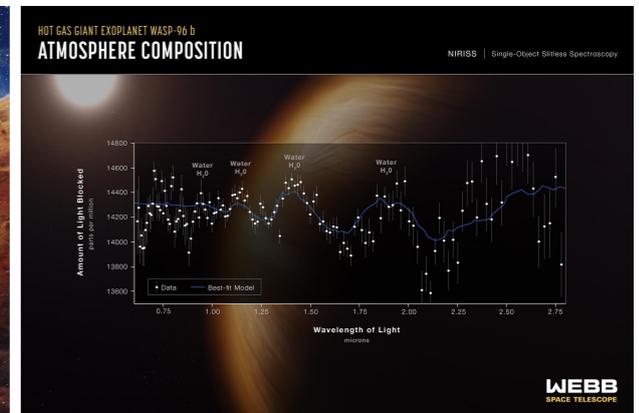
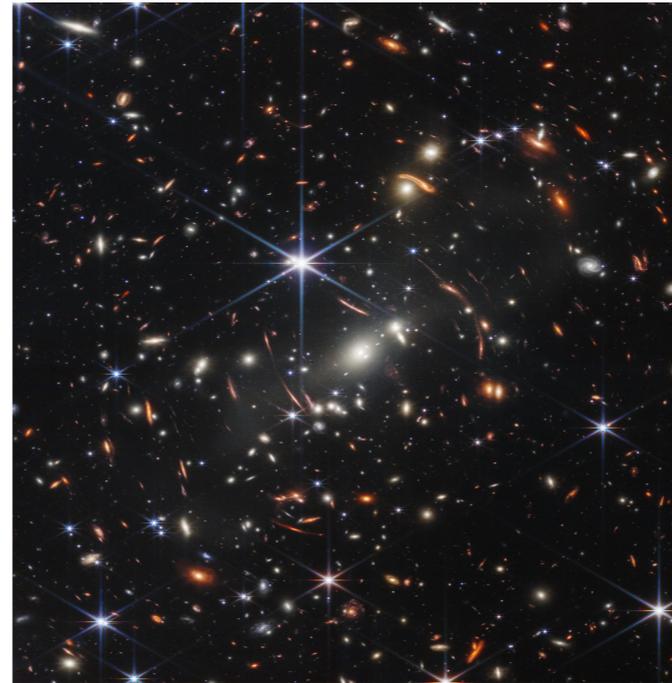
Micrometeoroids

- Sometime between May 22 and May 24, 2022 a micrometeoroid hit segment C3
- Caused an uncorrectable change in the figure of that segment (5-10 nm rms above previous measurements)
- Effect is small overall because of the small area affected
- Operations staff are considering if means need to be taken to minimize chances of future such



Early Release Observations

- [Early Release Observations \(EROs\)](#) demonstrated Webb's capabilities, showing the deepest observations of our universe, an exoplanet spectrum, stellar death, galactic mergers, and stellar birth.
- ERO data and commissioning data is now available in the STScI MAST archive for access from anyone in the world.
- President Biden released Webb's First Deep Field from the White House on July 11, 2022, where he said, "We can see possibilities no one has ever seen before. We can go places no one has ever gone before."





ERO Traditional Media

- From first image release on July 11 through July 14, there have been nearly 10K traditional media stories on the telescope and images.
- The front pages of 83 domestic newspapers and 45 international newspapers mentioned the release of the first full-color images from NASA's James Webb Space Telescope.
- Themes of coverage focused on the stunning full-color images, the potential of future discoveries, and the power of the telescope.

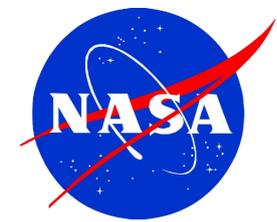


Top Outlet Headlines

- [Webb Telescope Reveals a New Vision of an Ancient Universe \(New York Times\)](#)
- [How Pictures from the Webb Telescope Compare to Hubble \(NBC News\)](#)
- [NASA's James Webb Space Telescope Captures Groundbreaking Images of Distant Galaxies \(NPR\)](#)
- [NASA Reveals Webb Telescope's New Images of Stars, Galaxies and an Exoplanet \(CNN\)](#)
- [James Webb: NASA Space Telescope Delivers Spectacular Pictures \(BBC\)](#)
- [James Webb Space Telescope Full-Color Images Dazzle \(FOX News Channel\)](#)

Notable Coverage

- [NASA Releases First Photos from Webb Space Telescope \(People Magazine\)](#)
- [NASA Reveals More Incredible Pics from Space \(TMZ\)](#)
- [Disco was right! NASA's glitterball images were predicted by pop music \(The Guardian\)](#)
- [Son of sharecroppers, HBCU grad was the man who fixed NASA's giant space telescope \(The Grio\)](#)
- [Unfold the Universe: How NASA Made the Stars Accessible \(Accessible Social\)](#)
- [NASA Shares Sharpest, Deepest Picture of the Universe Ever Taken; Internet Responds with Memes \(Know Your Meme\)](#)



JWST Cycle I Long Range Plan

ERS data in the archive for TEMPLATES and CEERS programs

LRP Cycle I Dates: 27-June-2023 to 2-July-2023

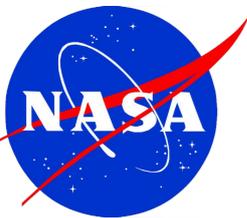
Category	Total Time [hrs]	Total Planned Time [hrs] (%)
GO	6090.1 ¹	5749.7 (94%)
GTO	3774.0 ²	3667 (98%)
ERS ³	529.5	529.5 (100%)
Cal	659.6	659.6 (100%)
Total	11023.2	10491.0 (95%)

¹Includes 200.5 hrs of ToO's which do not get planned until activation

²Includes 5.2 hrs of ToO's which do not get planned until activation

³Bulk of ERS programs are scheduled in the first 5 months of Cycle I

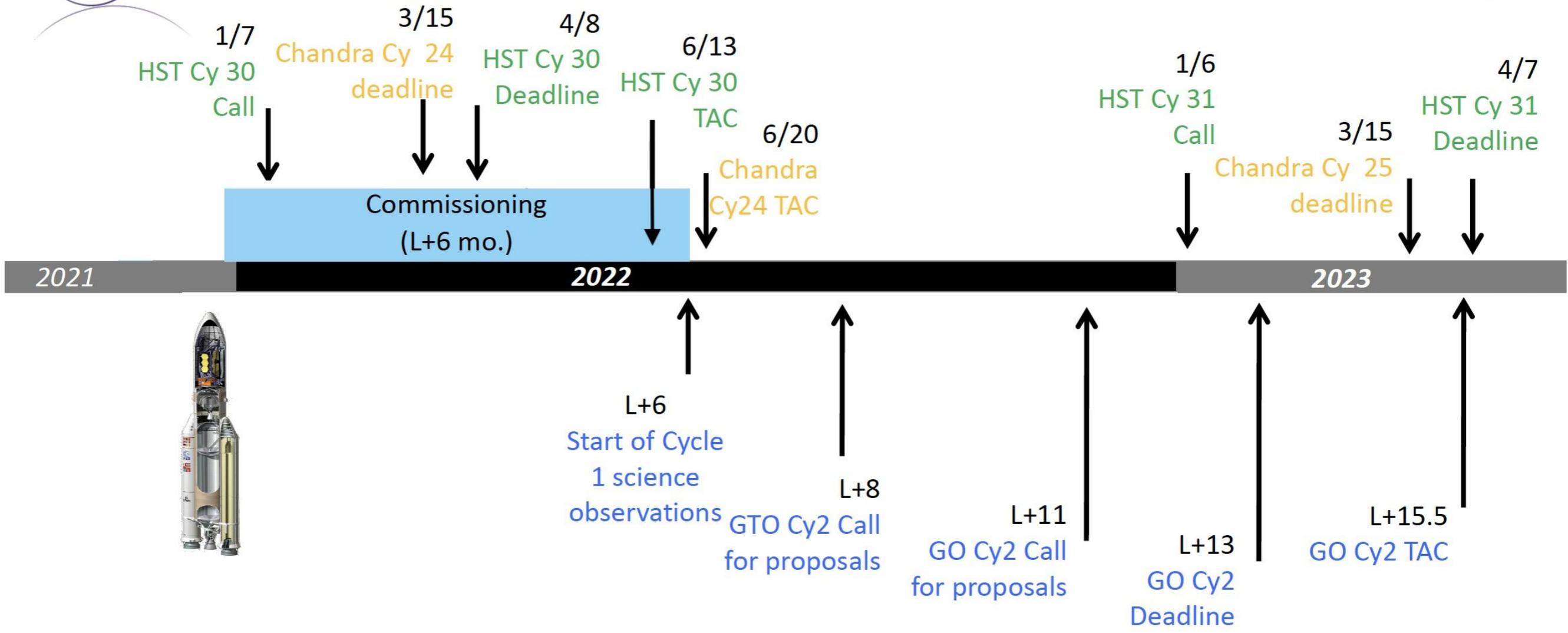
<https://www.stsci.edu/contents/news/jwst/2022/schedule-for-cycle-i-science-operations-released>



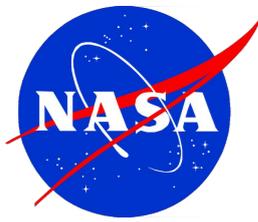
Science Timeline



JWST Science Timeline



HST & Chandra dates are estimates



Summary

- The JWST era has begun
- Observatory health is good
- Observatory performance meets or exceeds performance goals
- Worldwide reaction to the news was outstanding
- Be bold for Cycle 2!